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Interview with Dr. Jason King, Royal Society University Research Fellow, Department of Biomedical Science, The University of Sheffield, U.K.

Jason acquired his scientific training by traveling to all corners of the U.K., from Birmingham to Cardiff and on to Glasgow, before settling down in Sheffield, where he established his independent laboratory only 5 years ago. During his doctoral work in Adrian Harwood's laboratory he became interested in signaling, focusing on phosphoinositides, an area that still fascinates him. During his postdoctoral work in Robert Insall's laboratory, Jason continued to exploit the secrets and advantages of *Dictyostelium* as an experimental model which he continues to use with great success to investigate phagocyte cell biology and host-pathogen interactions.

Q. Your studies aim to understand macropinocytosis, phagocytosis and autophagy in *Dictyostelium* and in mammalian cells, at rest and when challenged by pathogens. Those are ambitious goals in areas that are rather diverse and, at least in the case of autophagy, very competitive. Do you have the resources and manpower to tackle them all?

A. Probably not. It is definitely a challenge to maintain the right level of research focus, and for me this has been an evolution since I started my group 5 years ago. Initially, like many people at the time I started off studying autophagy but I quickly noticed how competitive and crowded that field was becoming. As a junior group leader with a very small lab this worried me, and at the same time I realized that autophagy, macropinocytosis and phagocytosis share common elements, as they are all lysosomal degradation pathways. As a professional phagocyte that can also grow using macropinocytosis, *Dictyostelium* is a great model for these processes with plenty of space to develop my own niche. I therefore took the strategic decision to shift into this area. It's hard getting the balance right when you start out and I do feel stretched a bit thin at the moment, but the plan is to narrow down the focus much more over the next year or so, which will be better for everyone!

Q. Can you cope with the growing technical needs and the exponential growth of literature?

A. This is another disadvantage of working on too broad an area. As a relatively small group you can only specialise in a limited number of techniques. The solution is to collaborate as much as possible to fill the gaps. I have been very fortunate to have some great collaborators which also help me cope with the literature – I have always enjoyed working with other people and the more heads you have thinking about a problem and reading papers the more likely you are to find the solution.

Q. Do you have one or more lieutenants in your lab that oversee each individual area? If not, do you have enough brain bandwidth to direct all aspects without becoming schizophrenic in the process?

A. Having a long-term postdoc or assistant to help oversee the lab would be amazing, but is quite hard to obtain, particularly for new group leaders. In the U.K. university system at least, most people are on fixed-term contracts so the lab is in constant flux. This means skills are always being lost and re-taught which cannot be efficient. I am very fortunate however to have a fellowship, so don't have too many teaching or administrative distractions. Right now the group hovers around 4-5 people, and whilst it's tempting to try to expand and do more projects, without a lieutenant of some sort I think I would struggle with any more and progress might not actually be any faster.

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Q. You have been independent for approximately 5 years. Was the transition difficult? Did you have a mentor within the institution that gave you guidance and support, or were you thrown into the deep end and asked to sink or swim on your own?

A. I was very fortunate to have very good support from both my new institution and my previous supervisor and collaborators. This is really crucial to make a success of the chance you are given, and it is in no-one's interest to invest in people for the short term but not support their progression. A key thing for me was to start up in a place where I fitted well – if other people are interested in your work and want to interact with you scientifically you will naturally get more support. It has also been very important that my department has largely protected me from teaching and administration so I have been able to focus on getting the science established. Whilst I am sure these other roles will come in time, having a fighting chance to get the lab up and running without distraction has really helped.

Q. If you did have a mentor, what did he/she do for you?

A. I am enormously grateful for my post-doctoral mentor for the freedom I was allowed to explore and establish my own interests, which were quite different to the rest of the lab. This was critical for me to prove myself as an independent scientist and set myself up independently. In addition, running a lab can be a bumpy ride, and the moral support to help deal with the inevitable rejections has been just as important as the more obvious things such as reading applications and manuscripts.

Q. You are engaged in editorial work and in the organization of meetings at a comparatively early stage of your career. Are you not overburdened? Do you think this is advisable for other young(ish) scientists at a comparable stage?

A. To an extent, I feel that we have a certain duty to contribute to the community in some way and be a good citizen. Getting involved doesn't necessarily have to be an enormous amount of work and can be very beneficial. Being an editor has really opened my eyes to how the publication process works – for example seeing how people deal with rogue reviewers, and experiencing how editors make their decisions – but I probably only handle a couple of papers a month. Organising meetings is a great way to raise your profile in a field, with the bonus that you get to cherry-pick all the people you want to hear and meet. Whilst I have been involved in organizing several meetings and conference sessions they have all been ones where most of the organization and fund-raising is done for you so the burden is relatively small. So I would very much advocate getting involved, but be selective!

Q. You spent 2 years as a Research Associate and approximately seven as a postdoctoral fellow. Although not unique, this seems like an unusually long training period. In retrospect, do you think it was optimal? Would you suggest current trainees to follow a similar path? Do you think biomedical scientists reach their peak performance at an early age, as is thought to be the case for physico-mathematical scientists, gymnasts and swimmers, or do we get better with age, like philosophers and wine?

A. Having more experience is generally a good thing and I think this was the right time for me so when I started my group I felt ready. Doing a long postdoc was very useful as the continuity made me much more productive than had I moved. That said, it took me almost 2 years to get an independent position and I came uncomfortably close to running out of funding, so my advice would be to start applying early rather than late – it may take several rounds of applications and interviews before you get it right.

Regarding the ageing of biologists, perhaps this is a better question for the interviewer! In such a competitive environment with routine rejection, doing good science requires passion, energy and resilience. It can be hard to maintain this over the long term and often people

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seem to get overloaded with other roles or simply want different challenges. For me personally I would like to think I have not peaked yet as I am very much still learning how to run a group.

Q. You have surely made many public presentations. Did your mouth ever get dry or your stomach or heart flutter before or during a talk? Does it still happen and, if not, how did you eliminate the nervousness?

A. I wonder if you ever truly get over nervousness giving a talk. Nowadays for me it varies more, depending on who the audience is and it is comforting when you have presented a set of experiments many times before. A big realization for me was that when group leaders give amazing seminar or conference talks they have probably given that talk many times before and had far more opportunity to hone their delivery than you have as a postdoc or student. When it is an important talk I still try to practice at least the start as this definitely helps get through the first few slides until I can relax. I also always ensure I have some water handy for when that dry throat strikes.

Q. Given the demands and competitiveness of current science, does success require us to be borderline obsessive about our work? Do you consider your life to be well balanced, rounded and healthy?

A. I highly value having a good work/life balance and think that spending long hours in the lab does not necessarily mean you are more productive. Being creative requires a certain amount of down-time and many of my better ideas have come whilst not at work. I am perhaps slightly unusual in that we had children whilst I was doing my Ph.D., so I have had to balance work and home life for the majority of my career. Although this has meant I worked less hours in the lab I think I became much more efficient with my time and if anything, more productive.

Balancing everything is always difficult, and has definitely become more of a challenge as I became a group leader. Life can sometimes seem insanely busy but I still largely manage not to work at weekends and things have gone OK so far.

Q. What is your relationship with your trainees? Personal or business-like? In the #meToo age some mentors in the medical field (at least in North America) are avoiding female trainees for fear of being involved in complicated, possibly conflicting situations. Is that happening in your surroundings?

A. This is a very sad byproduct of this campaign. I personally have not seen or heard of such fears but, it's not the sort of thing people talk openly enough about. It really shouldn't be hard to have a relationship with your trainees that doesn't cross the lines. You want to build a friendly, supportive lab environment, and as I am still (sometimes) working alongside my group at the bench, I probably interact with them more casually than if we just had weekly meetings. But I think as the PI, it is more comfortable for everyone to maintain some professional distance and ultimately it is up to you to set the example of what is and isn't acceptable. You want to be able to get on with everyone but you can't have the same relationship that people in the lab have with each other.

Q. If you look into your crystal ball, what field(s) do you recommend your trainees (and/or the readers of this interview) to train in to ensure future opportunities and possible success? In your opinion, where are cell biology and microbiology going, separately and together?

A. Undoubtedly, as the complexity and size of datasets increases, computational and mathematical skills will become ever more important. From being able to automate image analysis to handling 'omics data, these are the skills that we now need. If you can combine

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this with a sound understanding of the biology I think you will be well-equipped for modern research.

Q. Did you ever fear that you would fail in your scientific career? Did you contemplate alternatives? And do you plan to remain in academic research for the rest of your professional life?

A. I came very close to dropping out during the transition from post-doc to group leader. Now I am the other side of that cliff I am very optimistic for the future, but at the time it was quite harrowing. The most worrying part was that I did not really have a good back-up plan, but I enjoy writing so was beginning to apply for jobs in that area, as well as perhaps teaching – which I think I would also enjoy. It is a huge problem though that people are put in such a precipitous position relatively late on in a careers. As for my future plans, I try not to think about it too much. For now I love what I am doing and hope it continues until I retire, but you shouldn't be afraid of doing something else if it stops being fun.

Q. At the end of the day, what would make you feel that your career was satisfactory and worthwhile? As scientists we all profess/pretend to be altruistic and aim to save mankind from all ills, but is self-satisfaction or even self-preservation an important component?

A. If I'm perfectly honest, saving mankind has never really been my motivation. I like to do research because it's interesting, fun and a good challenge. I really love looking at cells down the microscope and the excitement when you've figured out how something works, no matter how apparently minor, is enough for me – although its obviously great if the knowledge is useful in some way. It would be disingenuous to think that ego and self-satisfaction are not important drivers though – everyone likes feeling successful and being perceived as such makes your life in science much nicer.

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